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The Thumbsucking Habit

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Interest in the habit of thumbsucking and effective methods for its treatment runs the gamut from laborers to executives, from quacks to orthopsychiatrists. The prevalence of the habit among infants, preschool and even school children, and its acknowledged harmful effects if prolonged, make its correction a matter of intimate concern to parents everywhere. The responsibilities of the pediatrician, the child psychologist, the dentist, and the public health worker, in the intelligent counselling of parents and in the prevention of physical deformities among children, have provoked extensive study and discussion of thumbsucking, as evidenced by its prominence in the scientific literature.

In the report herein presented, an effort has been made, through a careful review of the literature, to ascertain the more widely accepted views concerning the thumbsucking habit and the problems associated with it. Accordingly, there follows a summary of the more common theories concerning the causes of thumbsucking, the physiological and mechanical characteristics of the act itself, the harmful effects which make prolongation of the habit so undesirable, and the various methods of treatment advocated. It is recognized that other habits may be equally significant in the pattern of child behavior, growth and development, but this summarization will be confined to thumbsucking, probably the most common of these habits.

ETIOLOGY OF THUMBSUCKING

Although knowledge as to the specific etiological factors involved in the habit of thumbsucking is apparently limited, there is rather general agreement that psychic and functional influences are concerned in its establishment. Ribble,[1] following up the interesting work of Levy,[2] has pointed out the probable effects of insufficient sucking time during early infancy in provoking a tendency to develop the habit of sucking objects other than the nipple. She concludes that "an actual hunger exists in the newborn baby for tactile stimulation of the mouth. Sucking appears to satisfy three different aims of the developing organism, namely: the getting of nutriment, the better reflex stimulation of the respiratory mechanism, and finally the getting of tactile stimulation. . . . The integration of these elemental drives in sucking activity gives it considerable importance. When it is not easily established, or when it is not sufficiently exercised or prematurely interrupted, significant dissociations take place. . . . Dissociated sucking of thumbs or some habitual object . . . appears to come about when the infant does not get enough sucking exercise in connection with the taking of nourishment." Haas[3] bears out these views regarding the effect of tactile stimulation with the reminder that "every baby will start sucking automatically when a finger touches its lips,

and it therefore follows that many babies take one or more fingers to suck as the most conveniently available objects."

Starr,[4] Pullen[5] and A. L. Johnson[6] agree that thumbsucking grows out of the natural sucking instinct present in most all animals, and that the habit may develop as a perversion from this beginning. Slatoff, Fries and Davis suggest the significance of emotional disturbances as a factor in the etiology of thumbsucking, especially as manifested in unsatisfactory parent-child relationships.[4]

According to Diskin,[7] "Allergists say that thumbsucking in many cases arises from difficulty in breathing. Children with a nasal obstruction or nasal allergy are thought to get a little relief from pressure on the anterior portion of the palate."

MECHANICS OF THUMBSUCKING

The actual physiological procedures and mechanical forces involved in the act of thumbsucking are well summarized by Swinehart[8] as follows: "There are three main abnormal forces exerted in thumb-sucking: (a) the passive force of the digit between the arches; (b) abnormal contraction of the cheeks against the sides of the arches, and (c) abnormal muscular pressure of the digit against the palate." Villain[9] calls attention to the difference between what he terms a physiological habit and a vicious habit. He describes the different hand postures characterizing the physiologic thumb-*suckling* of the newborn baby and of the *thumbsucking* habit later developed by the infant or child. In the former, "the hand is closed and in prone position, the borders of the thumb being perpendicular to the occlusal plane of the teeth, and only the point of the thumb held in the mouth, so no pressure is made. . . . In the act of sucking the thumb, the dorsal part of the finger rests horizontally to the occlusal plane, with the palmar surface exerting the greatest force upon the premaxillae. . . ."

EFFECTS OF THUMBSUCKING

In spite of the fact that fingersucking has been the subject of frequent reports in the scientific literature as far back as 1834, apparently there remains today some disagreement as to the more satisfactory methods for its treatment. Although the specific etiology or origin of the habit is not fully understood, its adverse influence upon the development of the dental arches and regularity of the teeth appears to be well established. Imrie, in 1834, Nasmyth, in 1939, and McQuillen, in 1863, were among the first to report thumbsucking as a cause of malformation of the jaws and malocclusion of the teeth.[10]

Since those times many writers have corroborated these views. L. R. Johnson, [11] in 1939, summarizes previous reports with the statement, "It has been established and is generally accepted, that thumbsucking or fingersucking may be an etiologic factor in malocclusion."

The specifically dental effects of thumbsucking are described by Teuscher[12] as "pronounced protrusion of the upper anterior teeth, the

abnormal pressure of the cheek muscles against the posterior teeth causing narrowing of the arches." Swinehart[8] adds that "the abnormal forces of the habit distort the form of the structures of the internal face."

Many dental writers agree that these structural effects of the habit may not be permanent in nature if the practice is discontinued during the early years of life. L. R. Johnson,[13] Arnold,[10] Lewis,[14] Dreyfus,[15] and Forrest[4] state that if thumbsucking is stopped by the age of three to five years, deformities which may have developed will tend to be corrected automatically, provided normal lip action exists.

Other effects of thumbsucking which tend to establish the importance of its treatment and correction at an early age have been reported by various writers. Swinehart[8] concludes from his case studies that "Thumbsucking causes definite and often serious nervous disturbances. . . . Through nervousness, the habit exerts its influence on the general physical and mental processes. Its physical results may be such conditions as muscular tics, retarded growth, deficient weight or disordered bodily functions. Some of its principal nervous and psychologic consequences are unsound sleep, deficient appetite, abnormal restlessness, excessive crying, tantrums, lack of power to concentrate and unfavorable social behavior." Woodcock[16] asserts that "in a developed thumbsucking case we find among the more general symptoms eructations of atmosphere air which has been aspirated from without. . . . evidencing itself 'chiefly through the effect it produces, namely colic and flatulence. Deformities of the fingers, thumb or lips may result. . . . Sucking is an important contributing cause of diseased tonsils and adenoids. The habit may either induce their formation or stimulate their growth."

From the psychological aspect, Fishbein[17] states that "the habit may persist into later childhood, and the child's interest in the sucking act may be sufficiently great to prevent normal interest in essential activities. . . . It may warp the personality and encourage infantilism. Its persistence indicates that the child is not outgrowing babyhood."

Some writers have observed certain other habits, associated with thumbbiting, and other finger manipulations as modifications of thumbsucking. has been discontinued. Levy[18] describes nail-biting, lip-sucking and lip-biting, and other finger manipulations as modifications of thumbsucking. Woodcock[16] has stated ". . . sucking may be present as an isolated habit or it may be accompanied by such concomitant habits as nail-biting, masturbation, enuresis, spasmus nutans, pica, etc."

TREATMENT OF THUMBSUCKING

In view of the acknowledged physiologic, nervous and esthetic abnormalities which may arise as a result of prolonged thumbsucking, it is generally agreed by psychiatrists, psychologists, mental hygienists, pediatricians, orthodontists, and dentists, as well as the laiety, that discontinuance of the habit as early in childhood as possible is most desirable. As to the effective methods of treatment of the habit, however, there is little uniformity of

opinion. To ascertain and correct the basic cause of the habit is generally advocated by psychiatrists as a fundamental objective of treatment. On the other hand, orthodontists and dentists as a whole seem to agree that, as Teuscher[12] has stated, "If the basic disturbance can be reached only with difficulty and after a long time, it is advisable to take steps to stop the actual practice of the habit, in order to prevent further disruption of the dental arches."

Mechanical restraint of the thumbsucking habit, through the use of devices such as mitts, splints over the elbow, application of distasteful substance, and intraoral appliances, has been used more or less empirically by parents and dentists for many years. It has been argued that in the disruption of such an undesirable habit and in the prevention of its harmful effects, the end justified the means. According to the psychiatrists' viewpoint, however, such measures are unjustified, not only on the basis of their potential nervous effects but also because their effectiveness is questionable.

A report of the Child Study Association of America[19] states, "The use of repressive means, such as mitts, splints, bandages and other devices for the prevention of thumbsucking, take no account of the fundamental meaning of the act in a child's life." According to Blatz and Bott,[20] "they deal with the superficial manifestations, not with the underlying causes of the habit; they take no account of the mechanism of habit formation and reformation they produce feelings of shame and rebellion in the child; and, in many cases, if they modify behavior it is by displacing the habit only to have it appear in some other undesirable form."

Buford Johnson[21] asserts that "It is very doubtful if mechanical contrivance on fingers or splints to arms aid as much as they interfere in the elimination of excessive thumbsucking. They are likely to focus attention upon the arm or hand which is already associated with the response, thereby serving as a stimulus." Wolf[22] also adheres to this view, stating ". . . Habits upon which we dwell with special attention may just so become fixed; the very effort directed against a certain habit may itself be responsible for keeping it alive." Slatoff[4] interprets this thought in the light of the parent-child relationship, "The mother's worry and intensity about the thumbsucking is carried over to the child and the habit, rather than disappearing, tends to become more intensified."

The methods of treatment recommended by psychiatrists are based largely upon an approach to the psychic and functional needs of the child. Langford[23] says, "Treatment should be largely limited to ameliorating the more obvious sources of emotional dissatisfaction in the child." Thom[24] advises that "in order to dispense with habits that are undesirable . . . it is of paramount importance to find a motive for their abandonment; that is, to substitute something in place of the rejected habit."

The attitude of psychiatrists in regard to treatment of the thumbsucking habit is represented in the conclusions of Fishbien,[17] "As a general rule, the

correct way of training nervous symptoms is to ignore them completely, and to have everyone else in the child's environment follow a similar plan. At the same time, general treatment should be employed. Assure sufficient rest, fresh air and sunshine for the child. Avoid undue excitement. Make use of the child's desire to grow up, and praise him as much as possible. This gives him a feeling of security and the wish to behave properly. See that the child has plenty of physical exercise and keep his hands busy."

The attitude of many orthodontists toward forcible restraint of thumbsucking is summarized in L. R. Johnson's statement[25] that "Mechanical appliances should be used to break habits only after other methods have failed." Markus[26] and Lewis[27] suggest that mechanical appliances are effective only in young children. Pullen[5] believes that "in connection with psychotherapeutic treatment, the wearing of protective or preventive coverings (mittens, etc.) may be of considerable service in bridging over the sleeping period when the conscious mind is at rest and the habit predominant." Heimlich,[28] evidently mindful of the deep concern manifested by most parents over prolonged thumbsucking by the child, advises, "Our attitude in these cases must be one of helpfulness; and wherever possible, I believe mechanical aid should be utilized. . . . There is no service an orthodontist can render which will win for him more whole-hearted appreciation from parents than the correction of a thumb or finger-sucking habit."

In regard to the older child, in whom the thumbsucking habit has persisted, there appears to be rather general agreement that psychological treatment is the more desirable and effective approach. Even here, however, the specific methods recommended vary widely. Langford[23] believes that "a broad program of personality and environmental readjustment" is called for, since the habit, in older children, "is most commonly seen as a part manifestation of a general emotional and social immaturity." Buford Johnson[21] advises "less attention to the reaction itself and more attention to provision of stimulation toward desirable activities." On the other hand, Nelson[29] states that "after a habit becomes fixed, it is usually practiced unconsciously" and recommends that it be brought "into the realm of the conscious by having the child sit before the mirror and practice the habit for five or ten minutes twice daily." Rewards, for children in whom the habit has not become too firmly fixed, are also suggested by Nelson. Haas[3] reports frequent success through the medium of a written contract, promising discontinuance of the habit, and signed by the child.

Psychological treatment, coupled with mechanical restraint, is approved by certain of the psychologists, as well as by many of the dentists who have contributed to the literature on thumbsucking. Thom[24] suggests restraint in older children, but with the child's consent and cooperation. Teuscher[12] believes that "in handling the older child, a confidential and sympathetic talk combined with the use of a mouth appliance will do the most good." L. R. Johnson[11] recommends, for the older child, placing boxing gloves on

the hand, and adds that "if the child understands that the boxing gloves are not placed on the hands as punishment, but as a help, and he sincerely desires to break the habit, success is probable."

Punishment, as a form of forcible restraint, is believed by Starr,[4] Nelson,[29] Haas,[3] Watson[30] and Fishbein[17] to be the least desirable as well as the least effective method of treatment for the thumbsucking habit.

The effectiveness of mechanical restraint, as compared with psychological treatment, has been questioned by many writers. Davis[4] reports that "In an informal study of 250 children of whom 154 sucked their thumbs, 88 were subjected to direct interference and 27 were said to have given up the habit because of what was done, while 52 have not stopped yet. Out of 39 thumbsuckers whose parents paid no attention to it, 17 have stopped (15 in less than one year), while 22 have not stopped yet." Blatz and Bott,[20] Watson[30] and Buford Johnson[21] are of the opinion that mechanical devices in general are ineffective and may even be harmful. Lewis[27] has concluded that "Though mechanical methods of treating such habits as thumbsucking may be useful in certain cases, especially with young children, psychological measures were found more successful with the present group of (thirty-two) children." Fishbien[17] points out that "Mechanical restraint, . . . while satisfactory in the occasional child, . . . will be unavailing or even harmful in another, depending on the child's personality and the fixity of the habit."

SUMMARY

(1) The prevalence of the habit of thumbsucking, among infants and children, and the potential harmful effects of the habit, if prolonged, are of sufficient importance to warrant the careful consideration of pediatricians, psychologists, dentists and public health workers.

(2) The exact causes of thumbsucking are not clearly understood, but appear to be associated with certain psychic and functional factors.

(3) According to many dental writers, thumbsucking, if discontinued by the third to fifth year of life, probably will not result in permanent physical disturbances to the child, depending to some extent upon the fixity and severity of the habit.

(4) Thumbsucking, if prolonged indefinitely, may produce serious deformities of the jaws and face, irregularity of the teeth and even disturbances of the nervous system, and may become associated with certain concomitant habits.

(5) There is little agreement as to the more desirable and effective methods of treatment of the thumbsucking habit, but most writers agree that its basic cause should be discovered and eliminated, if possible.

(6) Mechanical restraint of thumbsucking is generally disapproved by psychiatrists and child psychologists, who contend that this method deals only with the superficial manifestations of an underlying psychic disturbance or functional need.

(7) Psychological methods of treatment are generally believed to be more effective than mechanical restraint, especially with older children.

CONCLUSIONS

(1) There is a possibility that the thumbsucking habit might be prevented by insuring an adequate sucking time for the infant. This possibility deserves the serious consideration of the pediatrician and the parent.

(2) The treatment of thumsucking should be directed primarily toward the discovery and elimination of the basic emotional or functional cause of the habit.

(3) As a general rule, psychological treatment is preferable to mechanical restraint in the elimination of the thumbsucking habit, especially with older children.

(4) The use of mechanical restraint, with the possible exception of the intraoral devices, probably should be limited to the more incipient stages of the thumbsucking habit, during infancy, and then only after other methods of treatment have failed.

(5) Intraoral appliances, accompanied by psychological adjustments appropriate to the individual case, probably constitute the treatment of choice for older children in whom the thumbsucking habit has become fixed.

BIBLIOGRAPHY

1. Ribble, M. A. The significance of infantile sucking for the psychic development of the individual. J. Nerv. & Ment. Dis., 90:455-63, Oct. 1939.
2. Levy, David M. Experiments on the sucking reflex and social behavior of dogs. Am. J. Orthopsychiatry, 4:203-24, Apr. 1934.
3. Haas, Magda. The different sucking habits and their influence on the development of dentition. Dent. Rec., 57:633-55, Dec. 1937.
4. Conference on Thumbsucking. N.J.S. Dent. Soc. J., 11:4-12, Jan. 1940.
5. Pullen, H. A. Abnormal habits in their relation to malocclusion and facial deformity. Internat. J. Orthodont., 13:233-48, Mar. 1927.
6. Johnson, A. Leroy. Habit and adaptation. Dent. Cosmos, 65:845-61, Aug. 1923.
7. Diskin, Leon. Should thumbsucking be forcibly prevented? J. Den. Child., 9:110-13, 4th Quar., 1942.
8. Swinehart, E. W. Structural and nervous effects of thumbsucking. Am. Dent. A.J., 25:736-47, May 1938.
9. Villain, Henri. Thumbsucking. Dent. Cosmos, 75:202, Feb. 1933.
10. Arnold, E. B. Habit as an etiologic factor in malocclusion. Internat. J. Orthodont., 17:1051-6, Nov. 1931.
11. Johnson, L. R. The status of thumbsucking and fingersucking. Am. Dent. A.J., 26:1245-54, Aug. 1939.
12. Teuscher, G. W. Suggestions for the treatment of abnormal mouth habits. Am. Dent. A.J., 27:1703-14, Nov. 1940.
13. Johnson, L. R. Habits and their control during childhood. Am. Dent. A.J., 24:1409-21, Sept. 1937.
14. Lewis, S. J. Thumbsucking: a cause of malocclusion in the deciduous teeth. Am. Dent. A.J., 17:1060-73, June 1930.
15. Dreyfus, S. Prevention in orthodontics. Dent. Rec., 55:263-8, May 1935.
16. Woodcock, Irene G. Thumb Sucking. Med. Rec., 139:328-30, Apr. 4, 1934.
17. Fishbein, W. I. What to do about thumbsucking. Hygeia, 17:660-2, July 1939.
18. Levy, David M. Thumb or finger sucking from the psychiatric angle. Angle Orthodont., 7:100-3, Apr. 1937.
19. Fisher, D. C., and Gruenberg, S. M. (Child Study Association of America.) Our children. New York, Viking Press, 1932. p. 82-102.
20. Blatz, W. E. and Bott, H. Parents and the preschool child. New York, Wm. Morrow & Co., 1929 354 p.
21. Johnson, Buford J. Child psychology. Springfield, Ill., Chas. C. Thomas, 1932. 439 p.

22. Wolff, Ernst. Children's dentistry: an analysis of psychological aspects. Calif. State D. A. J., 15:129-32, July-Aug. 1939.
23. Langford, W. S. Thumb and finger sucking in childhood. Am. J. Dis. Child., 58:1290-1300, Nov. 1939.
24. Thom, D. A. Everyday problems of the everyday child. New York, D. Appleton & Co., 1928. 349 p.
25. Johnson, L. R. Control of habits in treatment of malocclusion. Am. J. Orthodont., 24:909-24, Oct. 1938.
26. Markus, M. B. A review of the literature pertaining to the influence of habits in orthodontia. Internat. J. Orthodont., 14:393-7, May 1928.
27. Lewis, S. J. Undesirable habits influencing the deciduous dentition. Am. Dent. A.J., 18:1767-78, Sept. 1931.
28. Heimlich, A. F. A correction for thumb and finger sucking habits. Internat. J. Orthodont., 21:1138-40, Dec. 1935.
29. Nelson, Beulah G. Habits which affect the development of the denture. Dent. Cosmos, 73:141-7, Feb. 1931.
30. Watson, J. B. Psychological care of infant and child. New York, W. W. Norton & Co., 1928. 195 p.

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Thoughts On Dental Health Education

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There is much that the dental profession thinks the public should know about teeth and there is much that the public would like to know about teeth. If we can combine the two sets of desires and provide the information to satisfy them we shall have made a real contribution to public health.

We know, or think we know, what we want to teach the public, and believe we have the correct answers. But—what is it that the public wants to know, and have we the answers for the items? Here is the real core of the problem, for health education is something that is accepted voluntarily or not at all. It cannot be crammed down the throat like the three R's in school. So if we are to educate the public effectively we must give them information that answers their questions. If, in doing that, we can throw in a few suggestions that will stimulate the asking of other questions, that will be all the better.

Unfortunately, the average dentist, either in his own office or in radio addresses or news articles, is apt to consider as being important those things that interest him. Without so much as asking the patient or the public whether they would be interested, he may launch into a rather lengthy description of dental phenomena that have no direct bearing on the dental health of his patient or the group he is addressing. He fails in other words to seek out and give consideration to the layman's point of view.

As an example of unessential and probably uninteresting (to the layman) information I cite part of a movie short that I saw recently. The introductory section showed dentitions of a variety of animals, both in live animals and in the skulls of the same species. The functions of the teeth

as to the kinds of foods eaten by the various animals were illustrated. In addition, the kinds of jaw motion used by each animal in relation to tooth form and kind of food was demonstrated on the skull. An effort was then made to illustrate the same points in regard to human teeth.

To the dentist these things are not only interesting but important, but they do not tell the layman anything he wants to know about teeth. In fact they do not even serve as an introduction to any essential information about the prevention of dental caries, periodontoclasia or malocclusion, disorders in which the layman is very much interested.

Another bit of information found in the film mentioned and in several others that I have seen is the naming of the human permanent teeth coupled with a description of their functions by classes, that is,—incisors, cuspids, bicuspids and molars. Even if we admit that these functions,—cutting, tearing, etc., are as usually stated, which is open to question (what does the preschool child use for biscuspids?), how many laymen care which teeth do what. People learn by trial which teeth are the most effective for which purpose and they certainly do not worry about it as long as they have teeth that meet effectively for their needs. As far as names are concerned I have seen very few laymen who care which teeth are bicuspids and which molars. And for the simple reason that that has nothing to do with maintenance of mouth health.

One kind of information the dentist is fond of giving and in which the parent *is* interested is in relation to tooth eruption. Parents are interested especially in the eruption time of the deciduous teeth, and are apt to go beyond the dentist in wanting to know, for instance, whether it is a sign of abnormality if eruption is much outside the expected time, whether it is harmful for the usual order of appearance to be altered, etc. The dentist should realize that in these questions there is no academic interest in tooth eruption as such but that the parent wants to be sure an unusual occurrence does not portend harm to the health of the child or of his teeth.

In the field of dental health for children there is a closer correlation between what the dentist wants to tell the layman and what the layman wants to know than in the case of the adult. Parents want their children to have good teeth—good looking and free from decay. For this reason they will listen to facts whose existence they did not suspect and about which they accordingly could not have been curious. However, even here, it is possible for the dentist to step too far out of the bounds of probable parent interest.

Just as the wise dentist when consulted by a new patient makes a point of maintaining patient interest while preparing to discuss that patient's problem and in presenting his diagnosis, so will the dental health educator be on the alert to keep within the field of interest or at least within "shouting distance" of the range of interest of his audience.

There is another aspect of this subject that requires attention. That is the fact that dentists have gotten into a rut of defeatism so far as the possibility of prevention of caries is concerned and reflect this in their health educational efforts. We seem not to realize that there is much that we can offer the parents of our child patients and of children in general that will actually lessen if not eliminate future susceptibility to caries. Dietary measures are mentioned but we have been preaching "balanced diet" for a long time without knowing just what we meant by the term. And since results to date in that field have been disappointing we make no worth while efforts to improve matters. Therefore dietary improvement is urged, if at all, in very vague terms and with no conviction. Then we turn, almost in relief, and assert that "Anyhow, dentists can fill cavities after they occur."

Thus the usual formula in dental health education is "Brush your teeth three times a day. Eat the proper foods. See your dentist twice a year." The element of advantage to the dentist in such advice is recognized, even if subconsciously, by the layman. There is too strong a contrast between the specific advice to take one's child to the dentist and the slight and vague consideration given to the possibility of lessening the need for dental visits through dietary reform or otherwise.

The dental profession is not entirely to blame for this situation. Dentists have been assured for many years that filling cavities was a means of preventing the development of new cavities. Thus "preventive denistry" has become identified with early filling of carious defects. Careful investigation reveals that new caries does develop in mouths that have had all previously occurring cavities filled, and in no mean numbers.

Reorientation of ideas is needed both on the basis of such information as the foregoing, and in regard to the very real accomplishments in true prevention recorded in recent years by such workers as Boyd of the University of Iowa, Bunting and Jay of the University of Michigan and Krasnow of the Guggenheim Dental Clinic of New York.

When this reorientation is accomplished dental health education will enter on a new phase, that of educating for prevention of caries, especially in the child, and with visits to the dentist placed in the proper perspective. I am sure that messages built on such a formula will arouse wide spread interest among the laity, not the least element of which will be a realization that dental bills in the future need not be as high as is the case at present.

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Penicillin and Its Use In Post-War Dental Therapeutics

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The problem of combating infection has always been of great interest to the dentist. Perhaps to date, the greatest contribution to the treatment of infections has been sulfanilamide, the parent compound, or one of its derivatives. Until recently, these compounds have been at best only bacteriostatic *in vivo*. The search has continued for substances which are bactericidal and which at the same time possess sufficiently low toxity for tissue to render their use practical.

The production of antibacterial substance by micro-organisms was first observed by Pasteur. Alexander Fleming working in London, in 1929, observed by chance that on a petri dish showing dense numbers of staphylococci, the micro-orgainsms failed to multiply in one small portion. Examination revealed that this part of the plate was contaminated with a mold colony. Fleming did some work with this mold, but the possible practical significance of Fleming's observations were not recognized until 1938, when Dubos, at the Rockefeller Institute, announced the discovery of gramicidin, a similar antibacterial substance. Stimulated by this American work, Florey and his associates at the University of Oxford undertook the study of penicillin, and late in 1940 they published the preliminary results of clinical and laboratory investigations.

Two extracts have now been made from the mold (penicillium) from which penicillin is made. The original extract is now called Penicillin A, and the new extract, penicillin B. Penicillin B is said to be ten times as effective as is penicillin A, and is even rarer. Penicillin B works its wonders in a test tube but not on living tissue. Penicillin A will be discussed in this paper, as it is the one now in clinical use.

Penicillin A is effective against all Gram-positive micro-organizims as well as against a great many of the Gram-negative micro-organisms. From the clinical experience recorded so far, penicillin has been found extremely useful in the treatment of infections due to the staphlycoccus, the hemolytic streptococcus, and to other bacterial infections encountered in the clinical practice of dentistry. At the present time there is some question as to the exact reaction of penicillin upon micro-organisms. The most widely accepted theory is that penicillin is bacteriostatic and prevents multiplication of the organisms, thereby giving the body defenses a better chance to protect and rid the body of the invading micro-organism. Some investigators claim to have proved, at least to their own satisfaction, that penicillin is bactericidal to some or all micro-organisms.

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One advantage of penicillin is that it may be administered in many ways. It may be administered orally, or subcutaneously, and may if it is pyrogen-free, be administered intramuscularly or intravenously without evidence of toxicity. Intra-oral administration has not been found satisfactory. In clinical dentistry, penicillin can be used as are the sulfa-compounds in tooth sockets after extraction, although only a very small amount of the drug is needed. When there is a general septic or weakened condition of the patient, penicillin may be administered intramuscularly or intravenously preoperatively. In the treatment of severe infections, particularly in the presence of bacteremia or where there is danger of bacteremia, continuous or nearly continuous intravenous use of pyrogen-free penicillin is the method of choice. In a dental practice this treatment would be indicated in acute or chronic osteomyelitis of the jaw or in a cellulitis. Very good results have been obtained from the use of penicillin in these cases. Penicillin may be used to good advantage where there are infected fistulous tracts, or sinuses. A liquid solution of the drug is the most easily applied in these cases. One of the newer methods of administration is the use of moist packs impregnated with small amounts of penicillium mold applied directly to the wound or sore. Dosages for penicillin vary with the infection, the patient, and method of administration, and must be given accordingly. Penicillin is rapidly absorbed when given intramuscularly and is slowly absorbed after subcutaneous injection. Administration of penicillin by internal methods has shown that absorption from the duodenum is rapid, whereas absorption in the mouth and in the rectal regions is poor. These findings may be explained by the inactivating effect on penicillin of gastric acids and colon bacillus.

As a therapeutic agent, penicillin has two ideal characteristics, (1) great activity against specific micro-organisms and (2) exceptionally low toxicity for their host. It is already clear that penicillin is the most effective agent so far discovered against the hitherto unconquered staphylococcus. Certain patients among those treated were suffering from staphylococcal infections so serious that sulfonamide therapy had failed and the outlook was considered hopless, yet these patients recovered when given penicillin.

The fundamental difference between penicillin and the sulfonamides is that the bacteriostatic action of penicillin is not affected by pus, the products of autolysis and protein catabolism-substances which are known to inhibit the activity of the sulfonamides. It is by virtue of this fact that penicillin has proved to be an effective therapeutic agent in the treatment of pyogenic or pus-producing infections which may not respond to intensive sulfonamide therapy. Penicillin exerts its antibacterial action regardless of the initial concentration of the organism. Thus, a concentration of 1:1000,000 will exert a definite inhibitory action when the initial concentration of organisms is of the order of several millions per cubic millimeter. Under such circumstances, the sulfonamides do not show any demonstratable activity. After

long and frequent administration of the sulfonamides, micro-organisms normally acted on by the sulfonamides become resistant to them. These conditions show rapid improvement under penicillin administration.

In regard to toxicity, penicillin is extremely remarkable. Hundreds of patients have been treated with it, and despite the administration of large amounts over prolonged periods, scant evidence of toxicity can be clearly ascribed to it. Occasional chills with fever, or headache, and flushing of the face have been noted. Urticaria, or hives, has been reported. Laboratory studies give evidence of a decrease in toxicity with increasing purification of the active component of penicillin. Clinical cases have confirmed this and have led to the conclusion that the toxicity is so low that it may be considered practically nonexistent in the pure forms. This is in sharp contrast to the action of the sulfonamides. A great many toxic reactions may be charged against the sulfonamides. Extensive kidney damage has been caused by the use of sulfonamides in susceptable persons. Many persons are allergic to the sulfonamides, and as the use of sulfonamides becomes wider spread, it is being discovered that even originally non-allergic persons can become and are becoming sensitized to the drug.

Clinical results which have a direct bearing upon the dental profession are not numerous, but enough cases have been treated with pencillin to prove its worth. In the following results, all treated cases are included, regardless of the amount of pencillin administered or the duration of the treatment. By present standards of treatment, it is known that many of these patients were inadequately treated both with respect to the total amount of penicillin that they received and to the total duration of the treatment. A total of thirty-seven cases of cellulitis were reported as having been treated with penicillin. This cellulitis was caused by either the staphylococcus aureus of by the hemolytic streptococcus; all were very serious cases. Of these thirty-seven cases, thirty-three, or about ninety per-cent of the cases recovered or improved. The drug had no effect on the remaining four, but they subsequently recovered. There were fifty-five cases of osteomyelitis treated, including a number of cases of osteomyelitis of the mandible. Of these cases, forty-eight, or about eighty-four per-cent, recovered or improved. The drug had no effect on the remaining seven. Penicillin has been tried on three cases of maxillo-facial actinomycosis. One of these cases recovered, but the remaining two died; so it is of questionable value in this infection.

There have been several very interesting case histories reported by the Mayo Clinic in connection with the use of penicillin. I should like to present one of these to you.

A white man, twenty-three years of age, was admitted to the clinic five days after extraction of the lower right third molar. Two days after the extraction, extensive swelling and marked pain had developed on the right side of the face. Leukocytes at that time numbered twenty-five thousand per cubic millimeter of blood. He had received one gram of sulfathiazole every

six hours until the time of his admission. He had also received sulfapyradine intravenously, together with three transfusions of blood.

At the time of the patient's admission, he was unable to swallow and was experiencing difficulty in breathing. He could scarcely open his mouth. The cellulitis was rapidly spreading into the neck on the right side. The rectal temperature at the time of admission was 103° F., but it rose gradually to 105° F. Blood cultures were obtained, and intravenous treatment with penicillin calcium was begun.

During the first twenty-four hours of treatment, the patient did not appear to be improving, and on one occasion he nearly died as a result of respiratory embarrassment. Forty-eight hours after the initiation of penicillin therapy, there was profuse drainage from the tooth socket, and the patient was able to swallow liquids. His temperature and pulse remained above normal. By the fourth day of treatment, he was making remarkable progress, and a blood culture obtained on this day was negative. He continued to improve. His temperature gradually reached normal after eight days of treatment. By the end of the first week's treatment, the patient was able to eat solid foods and felt entirely well. His total stay in the hospital was fourteen days, and, at the time of his dismissal, except for slight stiffness of the jaws, examination disclosed nothing of significance.

At the present time, intensive efforts are being made to expand production to the point where penicillin will be available not only for war casualties returned to this country but also for our Armed Forces overseas. Until these demands have been met, only limited supplies for civilian needs can be expected. The tempo of the work was quickened by the entry of the United States into the war after the attack at Pearl Harbor, and today some eighteen or more companies are engaged in the production of penicillin. In no instance has preparation advanced far beyond the pilot-plant stage; in the majority of cases, its preparation is still in the stage of laboratory development, although some companies now are building large plants for ultimate commercial production.

For intravenous administration of penicillin, it is desirable that the purest and most potent product obtainable be used. In order that patients may have the benefits of penicillin treatment not otherwise available, studies of the possibilities of the use of the crude product have been made, as the crude drug is much more easily obtainable. Since in the accounts of the therapeutic use of penicillin the continuous exposure of the infecting organism to the penicillin is stressed, it seemed possible to Robinson and Wallace of Pittsburgh that in surface infections the substance might be produced in contact with the lesion. Gauze dressings were saturated with a medium which contained penicillium. These dressings, containing the growing penicillium, were applied directly to infections on patients who had not been relieved by other acceptable forms of therapy. All of these infections were cured or improved.

Extensive chemical studies are being made to isolate the pure penicillin. Isolation and chemical determination of the pure penicillin will make it possible to synthesize the substance to the extent that the sulfanamides are now being produced. Great advances have been made in this field, and some optimistic investigators believe that within six months or a year the chemical formula will be known, and the synthesis of the drug will start. The discovery and use of this drug, perhaps the greatest contribution to the treatment of infections heretofore known, will undoubtedly be of great benefit to all those who practice the healing arts.

A Simple and Effective Space Maintainer

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INTRODUCTION AND REVIEW OF LITERATURE

It is universally agreed that following the premature loss of any posterior tooth in the growing jaw irreparable effects are very often developed, except where there have been provisions made for immediate replacement, or for the proper maintenance of the space. The causes for many of the adult malocclusions have been traced to the premature loss of the deciduous teeth, particularly the second deciduous molars, without the placing of space maintainers. Their loss is just as contributory a factor as the loss of the first permanent molar.

The literature on types of space maintainers, their use, construction, and benefits is far from barren, and it may be considered superfluous to discuss it in detail. In the main, the space maintainers at our disposal today consist of a band placed about and cemented to one anchor tooth. To this band is soldered a wire, the opposite end of which is fastened to a clasp or rest for the second anchor tooth adjoining the space. There have been introduced modifications[1] of that principle all of which have been most effective in the maintenance of the space. The orthodontic type as suggested by Dr. Meyer Hoffman[2] and the Willett[3] type are representative, the former being the band and soldered bar, and the latter being the cast overlay type. However, there are both time and economic factors which one must consider before such appliances are placed.

MATERIAL AND METHOD

When working with children in a free clinic in which both time and expense are very important considerations, the author has been able to apply the method described herein with effective results. The space maintainer consists of a bar of round stainless steel wire, eighteen gauge, the two ends

of which are engaged in two amalgam fillings placed in both teeth bounding the space created by the missing tooth.

Very often the second deciduous molar must be removed because of irremediable caries and if the teeth adjacent to the space are not to be condemned because of caries or other reasons, a space maintainer may be constructed providing the permanent bicuspids are in an early enough stage of eruption, six to eight years being the ideal age.

These approximal cavities are prepared in the usual manner for class II (MO in the first permanent molar and DO in the first deciduous molar.) After the cement bases are placed and the cavity margins reshaped, a piece of wooden toothpick is cut and bridged across both cavities, the ends of the toothpick resting on the gingival floor and barely touching the pulpal walls of the preparation. The occlusion is tested with the wood in position and any changes in the cavity preparation or for the position of the bar may be made at this time. The length of the wooden toothpick indicates the desired length of the wire bar.

The ends of the wire are rounded and dipped at least twice in cavity varnish—the first coat being allowed to dry before the second application is made. The varnish will prevent a union of the bar and the amalgam which is later to be placed into the cavities. After the appliance has been worn for a short time, the varnish will dissolve out and there will be occluso-gingival and bucco-lingual movement permitted in the teeth adjoining the bar—movement which is considered physiological since it is undesirable to have any fixed appliance in a growing jaw.

After the teeth are isolated with cotton rolls (or the entire process may be done under the rubber dam) and the cavities properly dried and sterilized, some amalgam is placed on the gingival floor and condensed to a thin layer upon which the bar is centered. It should be placed as nearly in the center of the gingival floor as possible. Additional amalgam is then placed into the cavities and around the bar with the usual condensation until the proper contour is reached. Care must be taken not to build the occlusion too high otherwise fracture of one or both proximal walls will result and the operation will be a failure.

Where desired, a small notch is cut into the matrix band so that it will fit over the bar, the filling then being completed in the usual way. At a subsequent sitting the restorations may be polished.

DISCUSSION

This space maintainer is applicable in children only in whose mouths the first permanent molar has erupted and reached suitable occlusal height to allow for sufficient bulk to hold the bar. Following the premature loss of the first deciduous molar, a bar may be inserted to retain the space by cutting a simple distal cavity in the deciduous cuspid and a DO cavity in the second deciduous molar. It may be used to good advantage also, in young adults

who have lost the first permanent molar or any other posterior tooth but who for economic reasons cannot afford to have a bridge inserted. In such cases the bar may be worn indefinitely or until a bridge is placed.

If the mesial surface of the first permanent molar does not have a cavity it is my opinion that cutting a cavity about two millimeters in diameter in the proximal surface is justifiable. A valid objection may be raised to cutting into a sound tooth but we cut into sound tooth structure in preparation for fixed bridges and in following out the principles of prophylactic odontotomy in children. Hence it is felt that if a malocclusion will be prevented it is justifiable to cut a tiny proximal cavity which will be filled later, that is, in those cases where the mesial cavity in the molar is not already present.

When the bar is placed in the child's mouth or even in an adult's, there is no more likelihood for recurrent caries to develop on the abutment teeth than would occur if no bar were present since the space allows for both approximal surfaces to be self cleansing, prohibiting food retention.

If one of the abutment teeth used is deciduous and must ultimately be shed or extracted the bar can be slipped easily out of the amalgam of the permanent tooth and the cavity thus created may be filled with some fresh amalgam. By that time the appliance will have served its purpose. When the first deciduous molar has become loose its erupting successor and the tooth for which the space has been maintained are now quite near the alveolar crest.

It is apparent that the situation concerning the placement of space maintainers may be reduced to two factors; the first being the time and the second the economic factor and it is usually a combination of both that determines whether or not it is placed. It has been found that an average time of forty-five minutes is required to complete the entire process of placing this space maintainer; but if the operator so wishes he can divide the procedure into two sessions, the first being for the cavity preparations and the second the placing of the bar and amalgam fillings.

It is obvious that this method is less time consuming than for the construction and placing of many other types of space maintainers as it entails no taking of impressions, pouring up models, fitting and soldering bands or casting overlays. Since this technic eliminates the use of the molar band the worry about decay under the band or the periodic changing and recementing of the band is also eliminated.

As for the expense of the materials involved for this technic it is but a few pennies making it possible for all children to have one placed when needed, whether it be at the free clinic or in the private office.

Young adults who wear space maintainers will appreciate the service too and at a future date may be in a position to have them replaced with the proper bridge work and there will not have been shifting of the teeth in the interim.

SUMMARY

1. A new type of space maintainer has been presented which consists of a bar of stainless steel whose ends are embedded into approximal amalgam fillings placed in both teeth adjacent to the space created by the premature loss of a tooth, particularly in the posterior part of the dental arch. The technic described permits physiologic movement of the abutment teeth, so necessary in normal growth of the jaws.

2. The time consumed in carrying out the complete operation of placing one of these space maintainers is many times shorter than that used for placing any of the other types for there is no necessity for laboratory work and it can be placed in one short sitting.

3. There is little or no more likelihood for caries to occur on the proximal surfaces of the anchor teeth than if no space maintainer were placed.

4. There is no need to change periodically or recement the appliance for preventing caries in the anchor teeth since the bar and the filling are self cleansing in this type of appliance.

5. The appliance is tolerated in the mouth readily, since it is not bulky nor loose enough for the tongue to play with it.

6. The cost of this space maintainer is negligible making it possible for one to be placed even in any free children's clinic where amalgam fillings are done.

7. In young adults, where for financial reasons permanent bridge work cannot be placed following the extraction of a permanent posterior tooth, this space maintainer can be placed to prevent effectively the drifting of the adjacent teeth, and at a later date the bridge may be constructed without any loss of space.

ACKNOWLEDGMENT

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REFERENCES

1. Hogeboom, F. E. New technical adaptations in the practice of dentistry for children. Am. Dent. A.J., 27:64-78, Jan. 1940.
2. Lusterman, A. Technical procedures in children's dentistry influencing normal growth and development. Dent. Items Interest, 59:352-63, Apr. 1937.
3. Willett, R. C. Radical departures from theories pertaining to children's dentistry. Am. Dent. A.J., 19:1085-102, July 1932.

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The Amalgam Proximocclusal Restoration in the Deciduous Molar

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Due to inherent characteristics of amalgam and certain peculiarities of the deciduous molars failures of the amalgam proximocclusal restoration are more frequent than of any other type. An analysis of the problem indicates that the causative factors may be controlled at least partially in the cavity preparation in the majority of cases.

The failures are of two types namely, fracture of the tooth at the bucco-gingival or linguo-gingival line-angle, and failure of the restoration at the axio-pulpal line-angle. The second type is by far the more common.

Since these failures are peculiar to the deciduous molar the underlying cause must lie in the form of this tooth or the strength of its structure. The latter can be ruled out, for while the deciduous enamel and dentin are not as strong as the permanent neither is the force of mastication as great. These teeth unless weakened by loss of tooth structure are apparently as capable of withstanding this force as are the permanent.

On examination of the deciduous molars, it is found that the enamel near the cemento-enamel junction is much thicker than in the permanent teeth. This bulk gives them an appearance of greater thickness and consequently of strength. In addition, sections show that the pulp chambers are larger than in the permanent teeth. The dentin walls are, therefore, relatively thinner at the approximate level of the gingival floor. Because of this fact care must be taken not to extend the gingival floor farther to the buccal and lingual than is necessary or the buccal and lingual enamel will be too closely approached. In addition, the buccal and lingual walls should not meet the gingival floor to form sharp line-angles but should meet it in curves or in other words, the bucco-gingival and linguo-gingival line-angles should be rounded. It is a well known fact among engineers that this type of angle is much stronger than the sharp angle.

While some of the failures of this restoration at the axio-pulpal line-angle may be assumed to be due to the use of a poor material or its improper manipulation or both it is not safe to assume that all are unless other factors are ruled out. If some of these failures result with materials that meet the specifications of the American Dental Association, and further if these materials have been manipulated and inserted in an approved manner so as to bring their desirable qualities to the maximum the cause of rupture must be the failure of the operator to meet the mechanical requirements of the case involved. While it is conceivable that the failure to meet the requirement may be in the occlusal anatomy and the resulting occlusal contacts with

the antagonistic teeth is seems much more probable that it lies in the preparation of the cavity.

A consideration of the cavity form in relation to the strength of the restoration brings out some pertinent and interesting points, but first it is necessary to point out several facts well known to engineers which are related to the stresses produced in materials subjected to external forces or loads.

When material, in the form of a cylinder is subjected to a compressive load parallel to its axis the cylinder is shortened in this direction. It resists the applied force with an equal and opposite force known as a stress which, with certain limitations, causes it to return to its original form. If the material is tough (malleable or ductile) and the load is continuously increased the cylinder will become visibly shorter and thicker. On the other hand if it is brittle it will fracture along a plane at about 45° with the horizontal. This failure is due to a shearing stress. It can be shown that the shearing stress in this case is a maximum at 45°, if the friction between the particles of the material is disregarded, and further it is known that brittle materials ordinarily have a shearing strength much below their compressive strength.

The statements just made serve as a simple illustration of the fact that when a body is subjected to an external force there result in the body different stresses or combinations of stresses in different planes and in different directions. They serve also to point out that in, a general way when at any point in a body any type of stress exceeds that particular type of strength for the material, failure will take place.

The proximocclusal restoration is similar in form to a beam of rectangular cross-section and its behavior under load (the force of mastication) is somewhat analogous. A mesiodistal section of a deciduous molar with such a restoration would show the occlusal lock portion supported by a thin layer of dentin overlying the large pulp chamber. Approximately at the axiopulpal line-angle there is a greater dentin support, the remaining axial wall. At this point the restoration curves over onto the proximal surface.

Under a vertically applied force the occlusal portion is deflected tending to rotate the restoration about the top of the stiffer axial wall. This force in turn would cause the proximal portion to move out of the cavity at the gingival. Since, however, it is (or should be) locked in this portion by firm packing of a plastic mix into the irregularities of the dentin walls the restoration must bend like a cantilever beam, the point of fixation being in the region of the axiopulpal line-angle.

It has been shown elsewhere that there would be the same effect, though to less extent, with a stiff material even though the pulp chamber were solid dentin.[1]

A horizontal beam supported at certain points and loaded vertically is subjected to tensile, compressive and shearing stresses in a complicated manner. If one end of the beam is fixed, making a cantilever, as in the proximocclusal

restoration, the bending stresses are a maximum at the point of fixation, the axiopulpal line-angle. It is not necessary to discuss this point farther but merely to point out that in designing such a beam for sufficient strength the engineer increases its depth rather than its width since its strength is proportional to the square of its depth but only to the first power of its width. For example suppose an occlusal lock 3 mm. wide by 2 mm. deep at its smallest cross-section has a certain strength and it is desired to increase its cross-section area in order to increase this strength. If the width is increased from 3 mm. to 4½ mm. (or 50%) the strength and the area of the section are increased ½ or 50%. If, however, the depth is increased from 2 mm. to 3 mm. (or 50%) the strength is increased 1¼ times or 125% though the area has again been increased only 50%. Because of variations from the ideal conditions for which calculations of this sort are usually made the values are only approximate. This fact does not, however, invalidate the principle involved.

The reason for failures in the deciduous teeth being more common than in the permanent apparently is due to the softer, more yielding character of the deciduous dentin which therefore carries a smaller proportion of the occlusal load, throwing a greater part onto the restoration. The condition of softness or yield must be distinguished from strength.

It was pointed out previously that rounded angles are stronger than sharper ones. While the problem involved is different from that of the bucco-gingival and linguo-gingival line-angles of the cavity it seems wise to round the axiopulpal line-angle as a precautionary measure.

The mechanical recommendations which have been made are entirely dependent on biologic considerations. If they require cutting the cavity in such a way as to expose or even endanger the pulp they would be entirely unsatisfactory except for pulpless teeth. However, such is not believed to be the case.

An examination of sectioned deciduous molars brings out a number of important points besides the comparative largeness of the pulp chambers. The pulps are concave occlusally and long acute horns project into the cusps. The buccolingual distance between the horns is comparatively small as expected from the fact that the external buccal and lingual walls of the tooth converge more strongly toward the occlusal than do those of the permanent teeth. This leaves narrow, steep-sided valleys between the buccal and lingual horns when viewed from the mesial or distal. The dentin covering the sides and bottoms of these valleys is very thin at the mesial pulp horns but much thicker at the distal.

Since the dentin between the mesial pulp horns is thin the fact that the valley between them is steepsided is most fortunate for it enables the occlusal step to be cut deeper by making it slightly narrower without increasing the danger of exposure and still giving the same cross-section area. This situation as pointed out above gives increased strength.

One final precaution must be taken in the preparation of the proximocclusal cavity. Because of the shape of the tooth and pulp chamber and thinness of the axial wall as seen in the mesio-distal seciton the axial wall of the cavity may not be placed deep to gain depth for the gingival floor. This condition is particularly true in mesial cavities and it does reduce gingival retention. However, this retention following proper operative procedure seems to be sufficient.

In closing, clinical experience indicates that the silver amalgam proximocclusal restoration in the deciduous molars presents greater difficulties than it does in the permanent teeth. The difficulty is a result both of the peculiar tooth form and the physical qualities of greater softness and yield of the structures of these teeth.

These difficulties may be at least partially offset by the application of well known engineering principles to the cavity form.

1. Gabel, A. B. Operative procedure, except restoration with inlays and paradental and root-canal therapy. p. 192-359. (In Ward, M. L., ed. American text-book of operative dentistry, 7th ed., Philadelphia, Leo & Febiger, 1940. 925 p.)

The Psychology of Child Management*

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The problem of managing a child at his first and subsequent visits to a dental office is a problem that ultimately resolves itself into the child's previous experience and background. The child who comes from a normal, well-balanced environment in which medical and dental visits are accepted as matter of rountine is likely never to be difficult. If his previous experience outside of the dental office is such as to make him nervous concerning any change in routine, then he is a potential management problem.

Management of the child is probably not much different from that of the adult. Unfortunately a tendency has grown to regard as humorous and witty, painful experiences in the dental office. An incalculable amount of harm has been done both to children and adults by this misguided sense of humor.

An additional amount of difficulty has been created by incorrect attempts to solve management problems. A common fallacy is to assume that since a type of treatment has been successful with one child that that same type of treatment will be successful for every child. Just because a dentist has been successful in controlling a child by brusque, curt methods to assume, therefore, that all children can be controlled by these same methods is fallacious. Likewise some children will respond beautifully to a modified

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nursery situation or to some diversional activity while waiting their turn in the dentist's chair, but every school teacher knows that not every child will react favorably to this type of management.

The problem of management of the child is a scientific problem; first, find the causes, then seek to control them.

A child facing a new situation is likely to sense some disquietude. It may amount to a definite fear. Fears are not innate but the result of experience. Watson's teachings in conditioning a child in terms of a fear situation show conclusively that the child may learn to be afraid even of situations that for the child originally were pleasant. The dentist's problem-patient is the result of some unfortunate experiences and he must try to determine the undesirable learnings.

The difference between adult and child learnings is not a difference in kind but essentially a difference in degree. The child, because of his youth and limited experiences will be compelled to react in a rountine way more frequently than an adult to a similar situation. The adjustment problem ultimately goes back to an understanding of the four basic human, so called, urges. Thomas, a social psychologist, names these drives or urges as first, the urge for security; second, the urge for response (affection); third, the urge for recognition; and, fourth, the urge for new experience.

The drive for security is one of the most potent on any level from infancy to old age. A child establishes the fear of lack of security in terms of behavior with relation to his parents and to his expanding social environment. If his social environment is one in which there seems to be some threat to his security the child will arrive at the dentist's office prepared to struggle for security either by a tantrum, or by flight into some other abnormal reaction with which he hopes to compel the dentist to obey him. Any submission by the dentist is likely to start a whole train of auxiliary problems.

This particular problem is likely to be aggravated if the second urge, fear of lack of affection, is operative. It becomes the case when a fond but nervous parent hover's nearby and by her presence leads the child to expect that his direct expectations are correct. Another form of maladjustment to the urge for affection comes with some children who have learned to magnify all forms of real ills and unconsciously to manufacture quite a few imaginary ones. Such a child will attempt to play upon the tender sympathies of even the gentlest dentist by an exaggeration of his slightest qualms. This type of child is extremely difficult to handle because he has been assured in his environment that he is a nervous, sensitive child.

The child who wishes to be important represents operation of the third urge. Failure to receive due recognition is apt to induce fears. A favorable aspect of this urge occurs when the child attempts to exaggerate his ability to submit to pain. Some witty individual has said that most people date their lives from their operations. All are familiar with the lengthy descriptions of the "difficult operation" through which individuals have come and

only the "super self control and amazing fortitude" of the victims enabled them to survive. Maladjustment of this attention-getting device will frequently be found in the child who is a management problem.

The fourth urge, the drive for new experience, also can be made the ally of the harassed operator. The basic human trait of wondering what is beyond the horizon, or on the other side of the mountain is a mobilizing force and will lead an individual to orient himself to a new situation. The dentist can capitalize this ability of the child and can use it to lead the child into a helpful and cooperative situations.

Since fears grow out of previous incorrect handling of these four drives, here is a clue to the correct management of children. First gain the child's confidence by being natural. A child will detect a pose more quickly than an adult. The operator should be perfectly frank. The child is accustomed to the idea of a little pain and to tell him that "you will feel this a little but I shall be as gentle as possible" is as quieting to the child's stirred up feelings as anything that the operator can do. When the child has discovered that it is within his capacity to bear the discomfort, he will react to the situation with a degree of pride which all feel when they realize that "they can take it."

The operator should have a sense of respect for children, have a desire to be of service yet impress them that he expects cooperation. Teachers have experienced the truth that classes will rise or fall to the level of the teacher's expectations. Children in a dentist's office are not different from children in the classroom; and, finally, the most integrative actions of life occur when one is permitted to do something about them. Ligon, in his book, "The Psychology of Christian Personality," and in the chapter on the "Chaos of Fear" points out that fears are reduced when some positive action is called for. As far as possible the child should be permitted to assist the dentist in his work. He should be permitted to hold something, preferably some instrument. Part of this effect is due to the fact that the human mind can pay attention to but one center at a time. If the natural attention is devoted to constructive activity, choatic fear is greatly reduced.

Perhaps one can best sum up by saying that the management of difficult cases in a dentist's office resolves itself into a problem of satisfying the child's basic urges in a constructive way, by an expression of the affection really felt for the child.

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EDITORIALS—

After Victory, What?

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At a time when all of us are thinking in terms of victory, we are apt to lay aside our cause for the sake of the immediate needs of our country. Yet

if we are to gain by a victory, we must be prepared and willing to assume our rightful place in the scheme of the new order. Already the automobile industry is talking in terms of "better than ever" with a public "anxious to buy." We of the dental profession are wondering if the Government will take over or allow us to struggle on. Do we think of "being better" or "public more anxious to buy"?

Dentistry was founded upon the adult needs of civilization, yet after a hundred years as a profession, we have no authentic knowledge of the young adult needs. In fact, only in the last few years have we had any well financed research into the cause of dental caries, the most prevalent disease known to civilization. Our efforts have been directed mainly towards improved technical procedure to provide a more intricate, more extensive replacement service for adult patients. Credit should go to those individuals for their genius who were responsible for providing this improved service. But, who will assume the responsibility of distributing this service?

Many men in practice find themselves inadequately equipped to provide personally this improved mechanized service. Because of the rather limited demand, few dentists can afford to become prepared adequately, thus encouraging the aid of an especially trained and patent protected group of technicians. Science has not only provided an improved service, but it has created a new influence quite necessary to the practice of our profession.

Probably the first and only information most dentists receive regarding economics is, "do good dentistry and the money will take care of itself." Probably this statement held true in the old frontier days, but in this industrial age there are too many attractions which "care for the money" before it reaches the dentist's office. In desperation, or in self protection, dentists avail themselves of courses in dental economics. Today this phase of professional influence has been improved to embrace practice management. It has given new hope and life to many a discouraged dentist by providing a means for economic security.

Dentists have learned the value of patient education but often this education takes the form of creating a desire among a few patients for "better" dentistry rather than a desire on the part of more people for adequate dentistry. In other cases the influence of dental education through school programs has created a patient desire that has not been provided by the dentists. Lack of uniform material suitable for educational purposes has confused both the dentist and the patient, yet no more sound source based on fact has been provided.

No matter what the cause, the fact remains that the majority of the people receive no dental treatment and the small percentage of people now being serviced receive far short of adequate dentistry. Following the sacrifices necessary to obtain peace is it wishful thinking to presume that all will want a more abundant life than before? Will dentistry be included in the more abundant life or will it remain the privilege of a few?

Some may say civilization or people have not changed. It may be so, but the art of living has changed. From the landing of the Pilgrims, frontier days, pioneering into new territorial claims, railroad expansion, industrial age, we progress to a world neighborhood. Yes, the art of living has changed and is about to enter an entire new phase. Industrial expansion, uncontrolled, must always seek new markets. The modern and future airway travel has opened the world to possible markets and made all nations and peoples neighbors. Indeed the world is shrinking and the population increasing. Dentistry must not only broaden its views to include all influence from within, but it must also think in terms of a world profession.

In this new order can we afford to think in terms of American dentistry? Can the profession become much of a factor in the new order if it remains basically different to any given geographical location? In the not too old order many professions deemed it "ultra" to complete their training in "foreign" lands. In time these same "foreign" countries found it advantageous to visit our shores for finishing work. In the new order we learn to regard other nations and peoples as equals through the interchange of ideas. We find ourselves no longer truly American but rather peculiarly American, rendering an influence to the larger community.

If dentistry, as conceived in America, is to become the pattern for the profession in this "smaller" world it should reorganize its total thinking. An honest, tolerant, all inclusive appraisal of influences which effect the American profession of dentistry should be accomplished immediately. We must not allow the confusion that attends the moulding of this new world to blind us or delay our thinking. Action will follow as our thinking becomes collective and is not allowed to narrow itself into personal or selfish thinking. The dentist in northern Maine, in western Michigan, in southern Scotland, in eastern Africa, should be included in our collective thinking. The manufacturer of dental materials, the supply house, the laboratories, the salesman, the Government, should all be included in our thinking. From this symposium should come material with which dentistry can build a professional foundation, solid enough to withstand the many types of "dental houses" needed to meet geographical and people's peculiarities.

Without fear of contradiction dentistry in America provides the best service of any of our new neighbors, yet only 20% of the great American people receive this service. Of this 20%, how many, dare we hope, receive adequate care, not to mention the available accepted best? Will this new world with new neighbors be satisfied with the present lack of dental benefits distribution, or will it demand a share of its rightful rewards? A glance at Government machinery should give us a fair idea to this answer. If we can not find the answer, then let us look at the progress of labor and wonder if their organizations will be happy without more of the worldly benefits.

Maybe we of the dental profession are incapable of guiding our own progress; maybe we need a $50,000 a year man to coordinate our billion

dollar a year professional potentialities. Because of our present organization, we should expect the initial step to be taken by our organization leaders. They should assemble all influences affecting our profession, lay the ball on the field, and play the game on the probable gridiron of the future. America is now united as never before. Let us grasp this opportunity to unite dentistry into a profession.

A.S.D.C. NEWS and VIEWS

The President's Message

State units have always occupied an important place in the structure of the American Society of Dentistry for Children. The officers and executive council have continuously endeavored to establish a closer relationship between the state units and the parent body. When the constitution was revised, provision was made for the state units to send delegates to the annual meeting of the Society. A special conference was scheduled, so that the delegates could meet with the executive council for a discussion of their problems.

Now that the annual meetings of the Society have been cancelled until after the war, the role which the state units play in the activities of the Society is of paramount importance. State units must now assume the responsibility of keeping alive the purpose for which the Society was founded, i.e. the advancement and dissemination of the profession and the public of knowledge of all phases of Dentistry for Children; and in particular, its relation to general health. I hereby appeal to every state unit to "carry on" the good work.

It is becoming extremely difficult for children to obtain dental services. In some sections of the United States the condition is acute. I am sure that an organized campaign by every state unit with the slogan "A Dentist for Every Child" would help to improve the situation. It would certainly be a most worthy undertaking.

At the request of the Chairman of the Council on Dental Health of the American Dental Association, the American Society of Dentistry for Children has undertaken a survey of dental teacher conclusions regarding a scientific answer to the question, "What are the minimum adequate dental services necessary for the optimal health of children?"

Questionnaires were sent to forty-one teachers and the accompanying letter stated "Granted, for example, that a compulsory prepayment plan will provide funds to supply those dental services which are essential for the growth, development, health and democratic living of each school child (a period from 3 years to 18 years), what services should be included in the program of dental care? We are not interested in this survey to secure a list of procedures which will provide the most esthetic forms of dental

restorations or the most ideal in occlusal relationships, except in so far as esthetic restorations and occlusions are considered essential to the health including the mental health of the developing child.

Will you please answer, therefore, the enclosed questions (after consultation with other departments, such as those of Orthodontics, Oral Surgery, Periodontology, Histopathology, Operative Dentistry and Pediatrics) as *scientifically* and as *soon* as you can?"

After a careful study of the answers received, lists of essential operative services were compiled for each age group (3-6, 7-12, 13-18). Copies of these lists were sent to all who answered the first questionnaire for the approval or rejection of each service listed.

The answers are being checked and the list of operative services to be recommended to the Council on Dental Health are now being compiled.

—*Ralph L. Ireland*

Report On The Chicago Midwinter Meeting

EUGENE J. NORTH, D.D.S.
Buffalo, N. Y.

The Eighth Annual Midwinter Meeting of the Chicago Dental Society had in its program much that was interesting and informative in the field of pedodontics. It was gratifying to note that, with but one exception, in every session I attended the rooms were packed to overflowing. For some time it has been a moot question whether depression-built dentistry for children might fall off considerably because of the present situation with too few dentists for too many patients. The Chicago meeting was very re-assuring in this respect. It was indeed gratifying to find the high percentage of older men still interested in this highly important field.

Although there were a great many service men in the meeting, very few attended the sessions on children's work. This is, of course, perfectly understandable, for right now these men would logically wish to learn more in the field of dentistry with which they come in daily contact. But it is important, I feel, that we should keep this situation in mind, for most of these men will be out of touch with children for a long time. It should be our responsibility, when the time comes, to re-kindle their interest in children's work. This group of men represents a large percentage of the graduates of the past decade, and I feel strongly that it will be tremendously inimical to their own interests, to those of the nation's children, and to dentistry as a whole if some concerted effort is not made to re-awaken their interest in this important aspect of dentistry.

Dr. George Morgan, in his paper on photography, showed that kodachrome stills are definite aids in diagnosis and treatment during the period

of arch development. Slides were shown to demonstrate that certain jaw relationship could be recorded that may be missed even by the use of good study models.

A regular mountaineers' feud, minus the shotgun, was touched off during Dr. Walter McFall's paper on "Problems in Children's Dentistry." It apparently started shortly after Dr. McFall's "Question and Answer" session on Tuesday, when he supported the use of silver nitrate reduction as a sterilizing agent. To the listener, it appeared that he painted caries with silver nitrate as a certain paint company "covers the earth." Charlie Sweet and Frank Lamons pitchd, with Walter on the catching end in a private session that ended about 3:00 a. m.

Dr. Sweet stressed the point that several studies have claimed silver nitrate to be of practically no value as a sterilizing agent. In his Wednesday session Dr. McFall retaliated by quoting a study purporting to show that Dr. Sweet's favorite sterilizing agent, phenol, is no better than sterile water as far as sterilization of tooth structure is concerned. I am sure that both will probably continue to use their favorite agents and remain as good friends as ever. Dr. McFall's paper was excellent, and as always, he was most entertaining.

In the operative section, Dr. Leon Saks presented a clinic on silicates, a subject I feel to be a great importance in our field of children's work. He stated that pulpal failures under silicate cement were most usual in teeth filled when young, that, therefore, a technic to be universal must be based on the requirements of young teeth. As this clinic was at the same time as my own, it was impossible for me to attend, but from all reports it was very informative and well-presented.

An essay presented by Dr. George Teuscher dealing with the Repair of Fractured Teeth in children was one of the finest I have heard on this subject. It was most complete, covering cause, prognosis, treatment and technics of restoration. The essay was augmented by excellent slides demonstrating the restorations used and showing sections in those cases in which pulp therapy was necessary. In the treatment of cases involving partial pulpectomy, he used a mixture of calcium hydroxide and sterile water which he placed in contact with the remaining pulp tissue. Dr. Teuscher demonstrated the creation of a new layer of odontoblasts between the pulp-chamber and the calcium hydroxide. He also demonstrated that these cells produced secondary dentine and stated that teeth thus treated tested vital.

Other essays and clinics covered the important fields of nutrition, the endocrines, space maintainers, and operatives aids and procedures. All in all, it was a most interesting, well-presented session as related to dentistry for children.

Treasurer's Report

December 31, 1943

Balance brought forward		$2,221.56
Checks deposited from 11-1-42 to 12-31-43		1,541.20
Cash in bank		$3,762.79
EXPENDITURES		
"Journal":		
Owl Printing Co., 4th Quarter of '42, 1- 4-43		$ 144.39
Owl Printing Co., 1st Quarter of '43, 3-19-43		147.83
Owl Printing Co., 2nd Quarter of '43, 6-28-43		167.65
Owl Printing Co., 3rd Quarter of '43, 10- 6-43		173.80
Owl Printing Co., 4th Quarter of '43, 11-12-43		147.90
		$ 781.57
Secretarial Expenses:		
Dr. R. M. Erwin, Jr., 12- 7-42		$ 19.21
Dr. R. M. Erwin, Jr., 3-10-43		30.56
Dr. R. M. Erwin, Jr., 3-19-43		80.00
		$ 129.77
Miscellaneous expenses 11-1-42 to 12-31-43		$ 302.79
Total Receipts		$3,762.79
Total Expenditures:		
"Journal"	$781.57	
Secretarial expenses	129.77	
Miscellaneous expense	302.79	1,214.13
Balance		$2,548.66
Outstanding checks		2.00
		$2,550.66

Interstate Conference on Dentistry for Children

An enthusiastic news report was received from Dr. Ast and a similar one from Dr. Apfel of New York which stated that during the Greater New York Dental meeting held in New York City the week of December 6th, an Interstate Conference on Dentistry for Children was held. This proved highly successful and they hope to make it an annual function. A report of the proceedings follows:

On Thursday, December 9th, in conjunction with the Greater New York Dental meeting held in New York City during the week of December 6th, the New York State Unit of the American Society of Dentistry for Children,

called on Interstate Conference on Dentistry for children which was well attended by representatives from Massachusetts, New Jersey, Rhode Island, Pennsylvania, Connecticut and New York. Dr. Robert L. Heinze, President of the New York State Unit, presided.

Preceding the luncheon meeting, through the courtesy of the New York City Department of Health and Dr. Harry Strusser, Chief of the Dental Bureau, the dental hygiene teachers employed in the New York City school dental program, presented a live puppet show depicting the essentials for good dental health, viz: satisfactory and adequate diet to help build sound teeth, chewing exercises to help stimulate the investing tissues, good daily oral prophylaxis and periodic examination and care by the dentist.

Following the introduction of guests from the various states represented at the conference and a discussion of the importance of dentistry for children in post war planning, the six points listed below were incorporated in a resolution which was unanimously adopted.

(1) Complete cooperation with the A.D.A. Council on Dental Health in projects relating to High School Victory Corps, public dental health legislation, and dental health education for dental practitioners.
(2) Establishment of a standard procedure to permit children to attend to their dental needs during school hours if necessary.
(3) Establishment of a national and state dental health day.
(4) Active representation in district societies, state and national organizations.
(5) Active cooperation with all state and national health agencies and child welfare organizations.
(6) Presentation of group clinicians (Dentistry for Children) at State and National dental conventions.

It was the consensus of those attending that the Interstate Conference on Dentistry for Children should be made an annual function in conjunction with state dental society meetings and what representatives from the States included in United States Public Health Service District No. 1 be invited to participate in the conference. Dr. Heinze appointed the following committee to arrange for another conference at the time of the annual meeting of the Dental Society of the State of New York to be held during the week of May 8, 1944, in Buffalo.

Dr. J. M. Wisan, New Jersey
Dr. Paul M. Weber, New Jersey
Dr. Harold Burke, Massachusetts
Dr. Edward L. Soares, Massachusetts
Dr. David B. Ast, New York, Chairman

It was decided that a luncheon meeting be planned, followed by an afternoon session at which two papers were to be presented, one on the operative procedures associated with dentistry for children and one on dental research. Table clinics would also be presented.